

MAMMALOGY.—*New bats of the genus Corynorhinus*. CHARLES O. HANDLEY, JR.,
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A revisionary study of the lump-nosed or big-eared bats of the genus *Corynorhinus* has shown that the name *Corynorhinus rafinesquii* Lesson, currently used for the big-eared bats of the western United States, is actually applicable rather to the species inhabiting the southeastern United States, heretofore known as *Corynorhinus macrotis* LeConte. The prior name for the western bats is *Corynorhinus townsendii* Cooper. Geographic races of this species are: *C. t. townsendii* Cooper and *C. t. pallescens* Miller. In addition, three other populations of *C. townsendii* are sufficiently distinct to warrant recognition by name and are described herein.

For the loan of comparative material I am indebted to the American Museum of Natural History (AMNH), the Carnegie Museum (CM), W. Gene Frum (GF), the University of Kansas Museum of Natural History (KU), the Louisiana State University Museum of Zoology (LSU), the Texas Cooperative Wildlife Research Unit, Texas A. & M. College (TCWC), the University of Arkansas Department of Zoology (UAZ), and the University of Michigan Museum of Zoology (UMMZ). Specimens in the U. S. National Museum, including the Biological Surveys Collection, are designated with the abbreviation (US). Special thanks are due to John A. Sealander, University of Arkansas, for allowing me to utilize specimens under his care in the description of a new subspecies, and for his kindness in depositing the type specimen in the U. S. National Museum; to Aurelio Málaga Alba, Pan American Sanitary Bureau, for his cooperation in securing much needed Mexican specimens, one of which has served as the type of a new subspecies; and to Rollin H. Baker, University of Kansas Museum of Natural History, for allowing me to use specimens from a collection that he was studying.

Capitalized color terms are from Ridgway, 1912, *Color standards and color nomenclature*. All measurements are in millimeters and are given as averages followed by extremes.

Corynorhinus townsendii australis, n. subsp.

Type.—U. S. N. M. no. 297265; adult female in alcohol, skull removed; collected December 20, 1952, by Aurelio Málaga Alba; 2 mi. W Jacala, 5,500 feet, Hidalgo, México; collector's number 1053.

Distribution.—Arid interior mountain ranges of central and northern México.

Diagnosis.—Adult coloration: Upper parts—hair bases between Benzo Brown and Fuscous; hair tips brighter brown, burnished with dark brown; mass effect between Russet and Cinnamon-Brown; hair bases sharply differentiated from tips. Underparts—hair bases Natal Brown; tips about Light Pinkish Cinnamon on belly, somewhat darker on throat. Size averages medium for the subgenus; forearm averages relatively (relative to greatest length of skull) long. Rostrum averages relatively long, dorso-laterally inflated, and usually not particularly depressed; anterior nares relatively large and usually rounded posteriorly (dorsal view). First upper incisor normally without secondary cusp; upper canine averages slightly reduced; antero-internal cingular cusp of P⁴ frequently present.

Measurements.—Specimens from all parts of range. Twenty-two adult males: Total length, 96 (91–101); tail vertebrae, 47 (41–53); hind foot, 10 (9–11); ear from notch, 35 (32–38); tragus, 15 (13–17); forearm, 42.5 (39.4–44.5); greatest length of skull (incisors excluded), 16.0 (15.5–16.5); zygomatic breadth, 8.6 (8.2–9.0); interorbital breadth, 3.6 (3.4–3.7); braincase breadth, 7.8 (7.5–8.1); braincase depth (excluding auditory bullae), 5.7 (5.4–5.9); maxillary tooth row (anterior edge of canine to posterior edge of M³), 5.1 (4.8–5.3); postpalatal length (posterior margin of palate, excluding median process, to anteroventral lip of foramen magnum), 5.9 (5.6–6.2); palatal breadth (at M³), 5.7 (5.4–5.9). Twenty adult females: Total length, 100 (93–107); tail vertebrae, 49 (45–54); hind foot, 10 (9–13); ear from notch, 34 (31–36); tragus, 15 (14–15); forearm, 43.2 (39.2–45.1); greatest length of skull, 16.1 (15.5–16.5); zygomatic breadth, 8.7 (8.3–9.0); interorbital breadth, 3.6 (3.2–3.7); braincase breadth, 7.9 (7.6–8.3);

braincase depth, 5.7 (5.5–6.0); maxillary tooth row, 5.1 (4.9–5.3); postpalatal length, 6.0 (5.8–6.3); palatal breadth, 5.9 (5.6–6.1).

Comparisons.—*C. t. australis* is most similar to *C. t. pallescens*, but in dorsal coloration averages darker, browner, and less cinnamon. The two populations are not well differentiated cranially. Compared with *Corynorhinus mexicanus* G. M. Allen, *C. t. australis* is paler colored, with greater contrast between bases and tips of dorsal hairs; usually has more cross-ribs on the interfemoral membrane; has, on the average, larger tragus; larger skull; shallower braincase; longer, stronger, and less depressed rostrum; larger auditory bullae; and usually lacks a secondary cusp on the first upper incisor.

Specimens examined.—A total of 57 from the following localities: MÉXICO: Coahuila, Bella Unión, 1 mi. S & 4 mi. W, 3 (KU); Hacienda La Mariposa, 4 mi. W, 1 (KU); Muralla, 0.5 mi. N, 19 (KU); San Buenaventura, 9 mi. N & 4 mi. W, 1 (KU); San Buenaventura, 9 mi. W & 4 mi. S, 2 (KU); Sierra Guadalupe, 10 mi. S & 5 mi. W General Cepeda, 1 (KU). Durango, San Juan, 12 mi. W Lerdo, 2 (UMMZ). Guanajuato, Santa Rosa, 7 (US). Guanajuato (?), Charcas, 5 (US). Hidalgo, Grutas Xoxafi, 6.6 mi. SE Yoltepec, 1 (KU); Jacala, 2 mi. W, 3 (US); Río Tasquillo, 16 mi. E Zimapan, 1 (TCWC). Jalisco, San Andrés, 10 mi. W Magdalena, 3 (UMMZ); San Pedro, Guadalajara, 1 (AMNH). México, Lago Texcoco, 1 (US). Morelos, Cuernavaca, 1 (US). Oaxaca, Oaxaca, 1 (US). San Luis Potosí, Bledos, 1 (LSU); Presa de Guadalupe, 1 (LSU). Zacatecas, Sierra de Valparaíso, 1 (US). “México”, no exact locality, 1 (US).

***Corynorhinus townsendii ingens*, n. subsp.**

Type.—U. S. N. M. no. 296767; adult male, skin and skull; collected 4 December 1950, by John A. Sealander; Hewlitt Cave, 12 mi. W Fayetteville, Washington County, Ark.; collector's number 50-14.

Distribution.—Ozark Highlands.

Diagnosis. Adult coloration: Upper parts—mass effect between Hazel and Mars Brown; hair bases Fuscous. Underparts—hair tips between Light Vinaceous-Cinnamon and Light Pinkish Cinnamon; hair bases Fuscous. Distinction between bases and tips of hairs fairly sharp, on both dorsum and underparts. Size averages large for subgenus; forearm averages relatively long. Skull of heavy construction; rostrum rela-

tively long, inflated, and not depressed; anterior nares average relatively large and rounded in posterior outline (dorsal view). First upper incisor usually with at least a trace of a secondary cusp; anterointernal cingular cusp of P⁴ absent; molariform teeth robust.

Measurements.—Specimens from all parts of range. Seven adult males: Total length, 95 (90–102); tail vertebrae, 42 (35–46); hind foot, 10 (9–10); ear from notch, 35 (34–36); tragus, 14 (13–15); forearm, 45.2 (44.1–46.2); greatest length of skull, 16.6 (16.3–16.9); zygomatic breadth, 9.1 (9.0–9.1); interorbital breadth, 3.8 (3.8–3.9); braincase breadth, 8.2 (8.0–8.3); braincase depth, 5.8 (5.7–5.9); maxillary tooth row, 5.4 (5.3–5.6); postpalatal length, 6.2 (5.8–6.4); palatal breadth, 6.3 (6.0–6.4). Nine adult females: Total length, 98 (95–102); tail vertebrae, 46 (43–49); hind foot, 10 (8–12); ear from notch, 35 (34–37); tragus, 15 (14–16); forearm, 46.5 (45.1–47.6); greatest length of skull, 16.8 (16.5–17.2); zygomatic breadth, 9.1 (9.0–9.2); interorbital breadth, 3.9 (3.7–4.0); braincase breadth, 8.1 (7.9–8.4); braincase depth, 5.9 (5.7–6.1); maxillary tooth row, 5.5 (5.4–5.6); postpalatal length, 6.4 (6.1–6.6); palatal breadth, 6.4 (6.2–6.5).

Comparisons.—*C. t. ingens* is the most reddish and the largest race of *Corynorhinus townsendii*. From *C. t. pallescens* it is distinguished by darker, more orange or reddish coloration; average larger size; relatively larger auditory bullae; more inflated rostrum; relatively more robust molariform teeth; and more frequent development of a secondary cusp on the first upper incisor. Compared with *C. t. virginianus*, *C. t. ingens* has the dorsal coloration paler, less mantled with sooty; averages slightly larger in most dimensions; and has more frequent development of a secondary cusp on the first upper incisor.

Specimens examined.—A total of 16 from the following localities: ARKANSAS: Washington County, Basset Cave, near Hicks, 1 (UAZ); Devil's Icebox, Devil's Den State Park, 25 mi. SW Fayetteville, 9 (UAZ), 1 (US), 1 (GF); Hewlitt Cave, 12 mi. W Fayetteville, 2 (UAZ), 1 (US). MISSOURI: Stone County, no exact locality, 1 (AMNH).

***Corynorhinus townsendii virginianus*, n. subsp.**

Type.—U. S. N. M. no. 269163; adult male, skin and skull; collected 12 November 1939, by

W. J. Stephenson; Schoolhouse Cave, 4.4 mi. NE Riverton, 2205 feet, Pendleton County, W. Va.; no collector's number.

Distribution.—Central portion of the Appalachian Highlands in western Virginia and eastern West Virginia.

Diagnosis.—Adult coloration: Upper parts—mass effect between Prout's Brown and Bister; hair bases about Benzo Brown. Underparts—hair tips between Light Vinaceous-Cinnamon and Light Pinkish Cinnamon; hair bases Fuscous. Distinction between tip and base of hair sharp on underparts, poor on dorsum. Size averages medium for subgenus; forearm averages relatively long. Rostrum relatively long and not depressed; anterior nares wide and round in posterior outline (dorsal view). First upper incisor usually without trace of secondary cusp.

Measurements.—Specimens from all parts of range. Fifteen adult males: Total length, 101 (98–110); tail vertebrae, 50 (48–52); hind foot, 11 (10–12); ear from notch, 34 (31–38); tragus, 14 (11–15); forearm, 44.5 (43.1–46.4); greatest length of skull, 16.4 (16.0–16.8); zygomatic breadth, 8.8 (8.6–9.0); interorbital breadth, 3.7

(3.6–3.9); braincase breadth, 8.0 (7.7–8.3); braincase depth, 5.8 (5.6–5.9); maxillary tooth row, 5.3 (5.2–5.4); postpalatal length, 6.1 (6.0–6.3); palatal breadth, 6.1 (5.9–6.3). Ten adult females: Total length, 103 (99–112); tail vertebrae, 49 (46–54); hind foot, 12 (11–13); ear from notch, 35 (34–39); tragus, 15; forearm, 45.8 (44.6–47.4); greatest length of skull, 16.6 (16.1–17.0); zygomatic breadth, 9.0 (8.8–9.1); interorbital breadth, 3.8 (3.6–3.9); braincase breadth, 8.1 (7.7–8.4); braincase depth, 5.8 (5.5–6.0); maxillary tooth row, 5.3 (5.2–5.4); postpalatal length, 6.2 (6.0–6.4); palatal breadth, 6.1 (6.0–6.3).

Comparisons.—Requires comparison only with *C. t. ingens*. See account of that race above.

Specimens examined.—A total of 93 from the following localities: VIRGINIA: Tazewell County, Burkes Garden, 4 (US). WEST VIRGINIA: Grant County, Petersburg, 10 mi. S, 3 (CM). Pendleton County, Cave Mountain Cave, 1.4 mi. W Brushy Run, 11 (US); Hellhole, 3.6 mi. NE Riverton, 5 (US); Hoffman School Cave, 4.9 mi. SSW Franklin, 2 (US); Schoolhouse Cave, 4.4 mi. NE Riverton, 31 (US); "Smokehole," 29 (AMNH); "Cave Rock Cave," 8 (AMNH).

MALACOLOGY.—*Notes on American cyclophoroid land snails, with two new names, eight new species, three new genera, and the family Amphicyclotidae, separated on animal characters.* J. P. E. Morrison, U. S. National Museum.

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Eight American species of the land operculate group of snails up to now known as the Cyclophoridae that have come to the United States National Museum collections in recent years from different sources are here described as new. Studies of their family relationships are outlined briefly in advance of a complete biological revision of the American members of the two families concerned, the Cyclophoridae and the Amphicyclotidae. Anatomical analysis of American forms that previously have been included in the family Cyclophoridae has shown that this group is polyphyletic in origin. The almost complete fixation of the radular cusp formula of the endemic American genera identifies them only as American and does not give any differential clues as to their other relationships. The male reproductive characters, however, are

critically indicative of family and subfamily relationships, as I have already noted (Morrison, 1954). The American subfamilies Neopupinae and Neocyclotinae and the typically Asiatic Cyclophorinae of the land-snail family Cyclophoridae, in common with the marine gastropod family Littorinidae, possess in the males a verge with only a seminal groove on its surface. The external male organ or verge of the Littorinidae is epipodial in position and well developed. That of the subfamily Cyclophorinae of the Cyclophoridae is also epipodial in position, but rudimentary or vestigial.

Members of the American subfamily Neopupinae possess a prominent verge that is lateral to and behind the right tentacle, without any specialized terminal appendage. The genera *Aperostoma* (Fig. 4) and *Farci-men* (Fig. 1) both belong to the Neopupinae.